United States Environmental Protection Agency
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ENERGY STAR® LABELED HEAT PUMPS

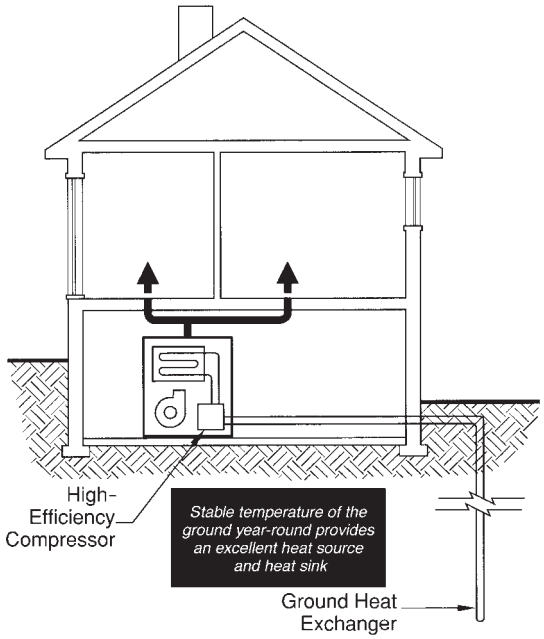
MECHANICAL EQUIPMENT IMPROVEMENTS

The U.S. Environmental Protection Agency's **ENERGY STAR® Program** promotes the use of high-efficiency technologies and equipment. ENERGY STAR labeled homes use at least 30% less energy than homes built to meet the national Model Energy Code while maintaining or improving indoor air quality. These fact sheets are designed to help consumers learn more about the energy-efficient improvements to their ENERGY STAR labeled homes.

Space conditioning is the largest user of energy in a residence, accounting for 40 percent of the average home's energy costs and more in extreme climates. ENERGY STAR labeled heat pumps are space conditioning systems that provide both heating and cooling. Heat pumps use a refrigeration cycle, just like refrigerators and air conditioners, to pump heat from one space to another. The difference between a heat pump and other refrigeration systems is a "reversing valve" which switches the system between the heating and cooling modes. The waste heat from these systems can also be used for water heating.

As shown in Figure 1, heat pumps can use either air, water or the ground as a heat source or sink. In the heating mode, the system extracts heat from the heat source and pumps it indoors. In the cooling mode, the system works just like an air conditioner and extracts heat from the indoor air and releases it to the heat sink.

FIGURE 1: ENERGY STAR LABELED HEAT PUMP



Heat pumps typically use a forced air distribution system. A fan blows air over a coil circulating the refrigerant that is either heated or cooled by the heat pump. As a result, the air is conditioned and circulated through ducts to the various spaces within a residence. A thermostat controls the system to maintain the spaces at an occupant-set temperature.

Heat pump compressors can be driven by either electricity or natural gas. Both of these fuel sources contribute to air pollution. Recognizing that high-efficiency heat pumps generate less pollution than standard efficiency heat pumps, the U.S. Environmental Protection Agency includes these systems in their ENERGY STAR Labeling Program. Heat pumps which exceed an efficiency threshold can display the ENERGY STAR label.

Prior to distribution, a sample of each heat pump model is tested for heating and cooling efficiencies. Each model is given a Heating Season Performance Factor (HSPF) rating and a Seasonal Energy Efficiency Ratio (SEER). HSPF is a measure of heating efficiency while SEER is a measure of cooling efficiency. Both values are a ratio of the seasonal energy output to the energy input. Federal law prohibits the sale of heat pumps with a HSPF rating less than 6.85 and a SEER rating less than 10.

ENERGY STAR labeled heat pumps have a minimum HSPF of 7 and a SEER of 12. ENERGY STAR labeled heat pumps may include upgrades such as: two speed compressors, high-efficiency motors, variable speed fans and improved heat exchangers. Additionally, some heat pumps are installed with desuperheaters to capture waste heat for hot water heating. ENERGY STAR labeled air source systems use

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RESOURCES

The Consumer Guide to Home Energy Savings (Wilson and Morrill), 5th edition, 1996, available from the American Council for an Energy Efficient Economy at 510-549-9914

Homemade Money (Heede and the staff of RMI), 1995, available from the Rocky Mountain Institute at 970-927-3851

The following fact sheets are available by calling the U.S. Environmental Protection Agency's toll-free ENERGY STAR Hotline at 1-888-STAR-YES (1-888-782-7937): ***Increased Insulation, Air Sealing, High-Performance Windows,*** and ***Right-Sized Air Conditioners***.

Heat Pumps fact sheet available from the Energy Efficiency and Renewable Energy Clearinghouse (EREC), P.O. Box 3048, Merrifield, VA 22116, 1-800-DOE-EREC (1-800-363-3732)

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10 percent to 30 percent less energy than standard heat pumps while water and ground source systems can use up to 75 percent less energy.

In addition to ENERGY STAR labeled heat pumps, ENERGY STAR labeled home owners often benefit from the installation of other improvements such as increased insulation, air sealing, high performance windows, and a high-efficiency duct system. These improvements can allow a smaller, less costly space conditioning system to be installed.

BENEFITS

Installing ENERGY STAR labeled heat pumps can provide many benefits including:

Increased quality. ENERGY STAR labeled heat pumps exceed the minimum efficiency levels established by federal appliance standards. These high-performance levels are often achieved with better components and improved technologies. This can result in longer equipment life and extended manufacturer's warranties.

Improved comfort. Some ENERGY STAR labeled heat pumps can provide improved comfort due to better technologies such as two speed compressors and variable speed fans.

Quieter. ENERGY STAR labeled heat pumps can generate less noise both inside and out for a quieter, more comfortable home.

Lower utility bills. Space conditioning costs the average home owner approximately $600 per year on their utility bills. ENERGY STAR labeled heat pumps can reduces this amount by $200 or more, making homes less expensive to operate.

Improved resale position. ENERGY STAR labeled heat pumps can provide the many impressive benefits discussed above resulting in a more comfortable, higher quality home with lower utility bills. This can translate into higher return and possible quicker resale.